

INFORMATION REPORT

COUNTRY USSR

SUBJECT Analysis of Various Rubber Airplane Parts

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four rubber samples which were taken from a plane (TU-2) landed by two Soviet defectors on the Hoersching Air Base, US Zone of Austria; in the fall of 1948.

1. Sample: 558169 Ind. #2
Identification - Packing gland - intake pipe
Polymer: polychloroprene (Neoprene like)
Durometer A: 65
Freeze point: 38°C (Gehman test)
Type black loading: coarse thermal
Per cent black in sample: 26.0 (based on weight of sample)
Other pigments present: MgO (small amount)
Clay (small amount)

Comments:

The polymer identification here was made from the X-ray diffraction pattern of the stretched specimen. Infrared absorption studies were attempted in the hope that we might ascertain whether the elastomer was made in emulsion polymerization or in a bulk (solvent) system. However, it was impossible to get the sample into solution even after a long period of heating in high boiling solvents so we are unable to answer the above question.

2. Sample: 558169 Ind. #3
Identification: oxygen hose
Polymer: natural rubber
Durometer A: 42
Freeze point: -63°C.
Type of black: SRF (semi-reinforcing furnace)
Per cent black in sample: 0.5
Other pigments present: Whiting (CaCO₃) (high loading)
Zinc oxide (small amount)

Comments:

Oxygen hose manufactured by our company is made by the Anode process from natural rubber latex and is therefore a tougher, higher strength product than the sample studies here.

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3. Sample: 558169 Ind. #4
Identification: tire tread
Polymer: natural rubber
Durometer A: 52
Freeze point: -62°C
Type of black: HPC (hard processing channel)
Per cent black in sample: 21.0
Other pigments present: Zinc oxide (small amount)
Magnesium oxide (small amount)

Comments:

Our airplane tire treads contain a considerably higher loading of black than was found here. Consequently our tread has a much higher Durometer hardness and modulus. This gives us better abrasion resistance but in so doing we must sacrifice chipping resistance which is also an important factor in airplane tires.

4. Sample: 558169 Ind. #5
Identification: hose
This sample was composed of two layers, the composition of the two being quite different. Therefore they will be treated separately.

Inside layer

Polymer: polychloroprene
Durometer A: 62
Freeze point: -39°C
Type of black: mostly HPC, small amount of SRF
Per cent black in sample: 23.9
Other pigments present: clay (high loading)
Zinc oxide (small amount)
Magnesium oxide (small amount)

Outside layer

Polymer: polychloroprene
Durometer A: 53
Type of black: coarse thermal
Per cent black in sample: 3.4
Other pigments present: Whiting (high loading)
Zinc oxide (small amount)

Comments:

If this sample is part of a fuel or oil line it is definitely inferior to the hose we would supply for this purpose, since we would use an acrylonitrile type rubber here instead of Neoprene. The former has superior oil resistance to Neoprene. However if this hose is hydraulic air hose it would probably do the job about as well as any we would supply. It is true that these compounds contain more clay and whiting and less black than is normally used in our Neoprene hose but the difference in performance due to these changes would not be striking.

5. General Comments:

None of the samples appear particularly unusual in any respect. While it was not possible to run tensile tests, qualitative estimates indicate these products are in general of about the same quality as similar products made in U.S.

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